IMMUNOLOGY

Faculty Profiles

JOHNS HOPKINS UNIVERSITY

JOHNS HOPKINS TECHNOLOGY VENTURES

JOHNS HOPKINS
TECHNOLOGY VENTURES

ERIKA PEARCE, PHD

Co-Director, Cancer Immunology Program, Professor of Oncology

RESEARCH INTERESTS

Major contributions to field:

– Development of therapeutics against metabolic pathways in immune cells

– Metabolic Competition in the Tumor Microenvironment Is a Driver of Cancer Progression

Recent work:

– Metabolic changes associated with immune activation, memory, and cancer evasion

RECENT RESEARCH HIGHLIGHTS

– Phosphoinositide acyl chain saturation drives CD8+ effector T cell signaling and function

– Intracellular infection and immune system cues rewire adipocytes to acquire immune function

– Multilayer omics analysis reveals a non-classical retinoic acid signaling axis that regulates hematopoietic stem cell identity

Faculty Webpage
Publications

INFECTIOUS DISEASES

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TECHNOLOGY VENTURES

ANDREA COX, MD, PHD

[Faculty Webpage]
[Publications]

Director, Medical Scientist Training Program, Professor of Medicine, Professor of Oncology

RESEARCH INTERESTS

Major contributions to field:

– Mechanisms of protective immunity against HCV infection and improve prophylactic HCV vaccine design.

– Randomized Trial of a Vaccine Regimen to Prevent Chronic HCV Infection

Recent work:

– Molecular analysis of HCV transmission, host immune responses, and virus sequence evolution

– Immunometabolic profiling of SARS-CoV2 infection in immunosuppressed individuals

RECENT RESEARCH HIGHLIGHTS

– Emergency myelopoiesis distinguishes multisystem inflammatory syndrome in children from pediatric severe COVID-19

– Heterologous versus homologous boosting elicits qualitatively distinct, BA.5-cross-reactive T cells in transplant recipients

– Cross-reactive antibodies facilitate innate sensing of dengue and Zika viruses

– Metabolic programs define dysfunctional immune responses in severe COVID-19 patients

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DIANE GRIFFIN, MD, PHD

[Faculty Webpage]
[Publications]

Alfred and Jill Sommer Professor and Chair, Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health, Joint Appointment in Medicine, Founding director of the Johns Hopkins Malaria Research Institute, Past president of the American Society for Virology, the Association of Medical School Microbiology Chairs and the American Society for Microbiology, Vice President of the National Academies of Science

RESEARCH INTERESTS

Major contributions to field:

– Development of novel vaccine approaches for measles and malaria

– Modulation of disease, T cell responses, and measles virus clearance in monkeys vaccinated with H-encoding alphavirus replicon particles

Recent work:

– How measles virus infection suppresses the immune system

RECENT RESEARCH HIGHLIGHTS

– Both ADP-Ribosyl-Binding and Hydrolase Activities of the Alphavirus nsP3 Macrodomain Affect Neurovirulence in Mice
– A durable protective immune response to wild-type measles virus infection of macaques is due to viral replication and spread in lymphoid tissues
– Visualization of cell-type dependent effects of anti-E2 antibody and interferon-gamma treatments on localization and expression of Broccoli aptamer-tagged alphavirus RNAs

JOHNS HOPKINS TECHNOLOGY VENTURES

ANTONY ROSEN, MBCHB, MS

Vice Dean for Research, Mary Betty Stevens Professor of Medicine, Professor of Medicine; Professor of Cell Biology; Professor of Pathology

RESEARCH INTERESTS

Major contributions to field:

– Mechanisms of autoimmune diseases

– Autoantigens targeted in systemic lupus erythematosus are clustered in two populations of surface structures on apoptotic keratinocytes

Recent work:

– Traits of autoantibodies that cause cellular or molecular dysfunction

– Understanding the connections between autoimmunity and cancer

Faculty Webpage

Publications

RECENT RESEARCH HIGHLIGHTS

– Autoantibodies targeting LINE-1-encoded ORF1p are associated with systemic lupus erythematosus diagnosis but not with disease activity

– The DNA sensors AIM2 and IFI16 are SLE autoantigens that bind neutrophil extracellular traps

– IgM anti-ACE2 autoantibodies in severe COVID-19 activate complement and perturb vascular endothelial function

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CYNTHIA SEARS, MD

Bloomberg-Kimmel Professorship of Cancer Immunotherapy, Professor of Medicine, Professor of Oncology

RESEARCH INTERESTS

Major contributions to field:

– Impact of gut microbiome on colon cancer development

– Sears Reveals Microbiome's Role in Colon Cancer

Recent work:

– Microbiology, bioinformatics and immunologic methods in human and mouse models

RECENT RESEARCH HIGHLIGHTS

– Murine fecal microbiota transfer models selectively colonize human microbes and reveal transcriptional programs associated with response to neoadjuvant checkpoint inhibitors

– Colon Tumors in Enterotoxigenic Bacteroides fragilis (ETBF)-Colonized Mice Do Not Display a Unique Mutational Signature but Instead Possess Host-Dependent Alterations in the APC Gene

– Bacterial-Driven Inflammation and Mutant BRAF Expression Combine to Promote Murine Colon Tumorigenesis That Is Sensitive to Immune Checkpoint Therapy

Faculty Webpage
Publications

JOHNS HOPKINS
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ELIZABETH JAFFEE, MD

Deputy Director, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Deputy Director, Institute of Clinical and Translational Research, Co-Director, Immunology Cancer Program
Associate Director, Bloomberg/Kimmel Institute for Cancer Immunotherapy, Professor of Oncology
Professor of Pathology, Co-chair of the Blue-Ribbon Panel for Vice President Joe Biden's National Cancer Moonshot Initiative

Faculty Webpage
Publications

RESEARCH INTERESTS

Major contributions to field:

– Development of novel vaccine approaches that overcome immune tolerance to cancers

– Core signaling pathways in human pancreatic cancers revealed by global genomic analyses

Recent work:

– How measles virus infection suppresses the immune system

RECENT RESEARCH HIGHLIGHTS

– Transfer learning reveals cancer-associated fibroblasts are associated with epithelial-mesenchymal transition and inflammation in cancer cells in pancreatic ductal adenocarcinoma
– Personalized neoantigen vaccine and pembrolizumab in advanced hepatocellular carcinoma: a phase 1/2 trial
– Mimicking the breast metastatic microenvironment: characterization of a novel syngeneic model of HER2+ breast
– Neoadjuvant radioimmunotherapy in pancreatic cancer enhances effector T cell infiltration and shortens their distances to tumor cells

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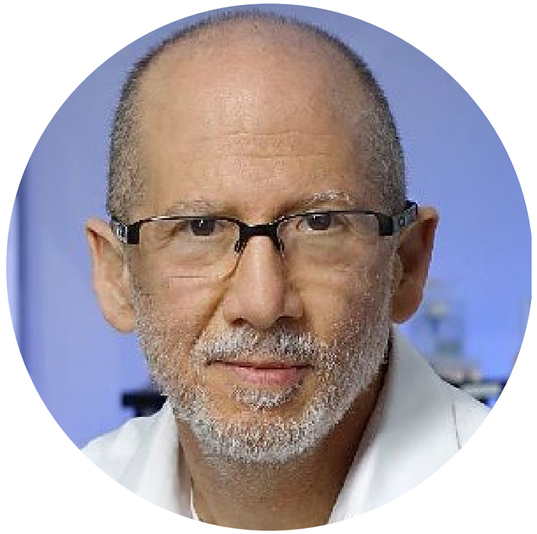
BERT VOGELSTEIN, MD



Professor of Oncology, Joint Appointment in Molecular Biology and Genetics, Professor of Medicine, Professor of PathGeneticology, Clayton Professor of Oncology, Co-Director of the Ludwig Center

RESEARCH INTERESTS

Major contributions to field:

– Understanding of human tumors arising from single cell with mutations in specific oncogenes

– A genetic model for colorectal tumorigenesis

Recent work:

– Targeting mutations or pathways for cancer therapeutics

RECENT RESEARCH HIGHLIGHTS

– Machine learning to detect the SINEs of cancer
– TRBC1-targeting antibody-drug conjugates for the treatment of T cell cancers
– The Origin of Highly Elevated Cell-Free DNA in Healthy Individuals and Patients with Pancreatic, Colorectal, Lung, or Ovarian Cancer
– Detection of rare mutations, copy number alterations, and methylation in the same template DNA molecules

Faculty Webpage
Publications

AUTOIMMUNITY FACULTY

SELECTION OF AUTOIMMUNITY FACULTY

JOHNS HOPKINS TECHNOLOGY VENTURES

Principal Investigator	Therapeutic Area	Targets/Projects for Partnership	Publications
Livia Casciola-Rosen	Autoimmunity – Sclerosis and Dermatomyositis	Interferon and autoantigens: intersection in autoimmunity. Autoantibodies and Cancer Association: the Case of Systemic Sclerosis and Dermatomyositis	Link
Patrizio Caturegli	Autoimmunity – Endocrine autoimmune diseases	Autoimmune diseases of the endocrine glands - myocarditis, thyroiditis, hypophysitis, Sjogren's syndrome, and complete congenital heart blockage. Immunoproteasome inhibitors for the treatment of Hürthle cell lesions	Link
Sonye Karen Danoff	Autoimmunity – Myositis	Exploration of ILD risk in patients with autoimmune myositis.	Link
Abdel-Rahim A. Hamad	Autoimmunity – T1D	Understand roles of non-conventional immune lymphocytes in the regulation of autoimmunity, particularly type 1 diabetes (T1D), obesity and type 2 diabetes.	Link
Maximilian Konig	Autoimmunity T cell therapeutics for autoimmunity	development of antigen-specific T cell therapy approaches, such as CRISPR-based engineering of chimeric autoantigen-T cell receptors (CATCRs), for personalized immunotherapies for autoimmune diseases	Link
H. Benjamin Larman	Autoimmunity Autoantigen/antibody detection	Platform technology development for detection of antibody (PhIP-Seq), antigen (MIPSA), microbes (cRASL-seq), etc Application for autoimmunity and inflammatory conditions	Link
Scott Newsome	Autoimmunity – Multiple sclerosis	Novel therapies and therapeutic strategies in multiple sclerosis and other neuroimmunological disorders	Link
Antony Rosen	Autoimmunity – Rheumatic diseases	Understand the fate and traits of autoantigens in autoimmune rheumatic diseases such as lupus, myositis, rheumatoid arthritis, scleroderma and Sjogren’s syndrome.	Link
Jonathan Schneck	Autoimmunity/ Immuno-oncology	Developed artificial white blood cells, artificial antigen-presenting cells (aAPCs) Improving anti-cancer therapies or enhancing immune suppression in autoimmune diseases	Link
Samuel Yiu	Autoimmunity – Corneal Diseases	Dendrimer-Hyaluronic acid nanoglues and hydrogels for corneal applications, and treating ocular disorders	Link

ALLERGY/ASTHMA FACULTY

SELECTION OF ALLERGY/ASTHMA FACULTY

JOHNS HOPKINS TECHNOLOGY VENTURES

Principal Investigator	Therapeutic Area	Targets/Projects for Partnership	Publications
Peisiong Gao	Allergy	Role of CD206 in cockroach allergen induced immune responses and lung inflammation TGF-β1 in mesenchymal stem cell mobilization in cockroach allergen induced asthma.	Link
Robert Hamilton	Allergy	Accurate quantification of allergen-specific IgE, IgG and IgA antibodies to identify indicators of risk for and protection from allergic reaction	Link
Nicola Heller	Allergy	Role of IL-4/IL-13 signaling and alternatively activated macrophages (AAM) in the pathogenesis of allergic inflammation.	Link
Donald MacGlashan	Allergy	Understanding the regulation of secretion from human basophils and mast cells. Regulation of Syk expression and the role of CD32b in modulating basophil function	Link
Sarbjit Saini	Allergy	Mechanisms of altered IgE-receptor signaling related to the phenotype of mast cells and basophils underlying chronic urticaria	Link
John Thomas Schroeder	Allergy	Mechanisms underlying the production of IL-4 and IL-13 by basophils Characterization of pDC in allergic responses and therapeutics	Link
Marsha Wills-Karp	Allergy	Activation of innate immune pathways via molecular mimicry of common allergens Gut microbiome alters susceptibility to allergen and PM-induced asthma	Link

INFLAMMATORY DISEASE FACULTY

SELECTION OF INFLAMMATORY DISEASE FACULTY

JOHNS HOPKINS TECHNOLOGY VENTURES

Principal Investigator	Therapeutic Area	Targets/Projects for Partnership	Publications
Jay Bream	Inflammation	Mechanisms of IL-10 in maintenance of inflammatory and anti-inflammatory responses	Link
Daniela Cihakova	Inflammation	Role of cardiac resident cells and monocytes in inflammatory heart disease and dilated cardiomyopathy	Link
Anthony Guerrerio	Inflammation	Effect of gliadin on permeability of intestinal biopsy explants from celiac disease patients and patients with non-celiac gluten sensitivity	Link
David Hackam	Inflammation	C34 triols in the treatment or prevention of inflammatory disorders in children and adults with a focus on necrotizing enterocolitis Gut organoid modelling	Link
Justin Hanes	Inflammation	Mucus-penetrating budesonide nanosuspension enema for the local treatment of inflammatory bowel disease	Link
Hamid Rabb	Inflammation	The role of T cells, gut microbiome, and checkpoint inhibitors in Acute Kidney Injury	Link
Cynthia Sears	Inflammation	Colonic microbiota on chronic colonic inflammation and cancer	Link
Arun Venkatesan	Inflammation	Developing therapies that restore neurogenesis during infection or inflammation	Link
Jeremy David Walston	Inflammation	Biology of chronic inflammation, frailty and vulnerability to adverse outcomes observed in older adults	Link
Fengyi Wan	Inflammation	Understand interactions between host cells, the microbiota, and pathogens to understand health and diseases in the colon	Link

INFECTIOUS DISEASE FACULTY

SELECTION OF INFECTIOUS DISEASE FACULTY

Principal Investigator	Therapeutic Area	Targets/Projects for Partnership	Publications
Justin Bailey	Infectious Disease	Hepatitis C virus E1E2 genes stimulating development of broadly neutralizing antibodies Synergistic anti-HCV broadly neutralizing human monoclonal antibodies with independent mechanisms.	Link
Ashwin Balogopal	Infectious Disease	Single-cell laser capture microdissection (scLCM) of hepatocytes for accurate quantification and single cell analysis of virally infected cells	Link
Andrea Cox	Infectious Disease	Multio-omics approach to understanding vaccine induced immune responses	Link
George Dimopoulos	Infectious Disease	Vector-borne diseases and how mosquitoes can be rendered incapable of transmitting human pathogens.	Link
Andrew Ewald	Infectious Disease	Three-dimensional organotypic culture: experimental models of mammalian biology and disease	Link
Anne Hamacher-Brady	Infectious Disease	Mechanisms that regulate mitochondrial contribution to programmed cell death, autophagy and inflammation signaling	Link
Diane Griffin	Infectious Disease	Viral disease mechanisms and how immunity leads to both recovery and protection from re-infection	Link
Gary Ketner	Infectious Disease	Fundamental molecular biology of DNA-containing human viruses and their role in preventing diseases of public health importance	Link
Sabra Klein	Infectious Disease	Progesterone-Based Contraceptives Reduce Adaptive Immune Responses and Protection against Sequential Influenza A Virus Infections Sex-differences in response to vaccination to SARS-CoV2 and Influenza	Link
Andrew Pekosz	Infectious Disease	Influenza A Virus M2 Protein Apical Targeting Is Required for Efficient Virus Replication Replication and disease potential of respiratory viruses including influenza and SARS-CoV-2	Link
Stuart Ray	Infectious Disease	Evolution of HCV during acute and chronic infection, developing and applying computational and molecular biology tools to underlying mechanisms including stochastic variation, immune selection, and viral fitness	Link

SELECTION OF INFECTIOUS DISEASE FACULTY

JOHNS HOPKINS TECHNOLOGY VENTURES

Principal Investigator	Therapeutic Area	Targets/Projects for Partnership	Publications
Richard Roden	Infectious Disease	Vaccination with multimeric L2 fusion protein and L1 VLP or capsomeres to broaden protection against HPV infection	Link
Robert Siliciano	Infectious Disease	Drugs to target the latent reservoir for HIV-1 in resting CD4+ T cells Development of autologous broadly neutralizing antibodies against HIV-1 for enhanced vaccine development	Link
Raphael Viscidi	Infectious Disease	Development of an avian influenza virus-like particle vaccine Development of a SARS-coronavirus vaccine	Link
Fidel Zavala	Infectious Disease	Development of a novel virus-like particle vaccine platform that mimics the immature form of alphavirus Characterizes the molecular and genetic events involved in the induction of effector CD8+ T cells and the regulatory pathways involved in the development of memory cell subsets	Link

IMMUNO-ONCOLOGY FACULTY

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SELECTION OF IMMUNO-ONCOLOGY DISEASE FACULTY

Principal Investigator	Therapeutic Area	Targets/Projects for Partnership	Publications
Franck Housseau	Immuno-oncology	Improve clinical responses to immune checkpoint blockade by modulating microbiome, tissue repair response and aging	Link
Elizabeth Jaffee	Immuno-oncology	Development of novel vaccine approaches that overcome immune tolerance to cancers Genomic and proteomic methods for identifying new pathways and biomarkers associated with the development and progression of pancreatic cancers.	Link
Erika Pearce	Immuno-oncology	Role of metabolism in regulating the development, survival and function of T cells Develop ways to make better, long-lived T cells that will improve immune therapies against tumors, pathogens, and other diseases.	Link
Kellie Smith	Immuno-oncology	MANAFEST (mutation associated neoantigen functional expansion of specific T-cells) Monitor responses to mutation associated neoantigens, endogenous retroviruses, tumor associated antigens, and viral antigens	Link
Jamie Spangler	Immuno-oncology	Engineering antibody-based molecules that reshape immune cell behavior for targeted treatment of cancer, infectious diseases, and autoimmune disorders	Link
Bert Vogelstein	Immuno-oncology	Development of new approaches to the prevention or treatment of cancers through a better understanding of the genes and immune pathways underlying their pathogenesis	Link
Jelani Zarif	Immuno-oncology	Discovering and investigating new biomarkers that may be expressed on myeloid cells to predict clinical response to standard of care treatments for prostate cancer	Link
Shibin Zhou	Immuno-oncology	Improving efficacy of immune checkpoint blockade by epigenetic modulation of myeloid derived suppressor cells Therapeutic approaches based on scFvs specifically targeting driver mutation-derived neoantigens presented by HLA molecules	Link